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Biogeosciences
Discussions

Interactive comment on "Hydrologic control of the oxygen isotope ratio of ecosystem respiration in a semi-arid woodland" *by* J. H. Shim et al.

Anonymous Referee #1

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This is a substantial research effort that reports variations in the oxygen isotope composition of ecosystem respiration in relation to climate in a semi-arid temperate woodland. These ecosystem scale observations provide a very important link between leaf level studies and global studies of the d18O of atmospheric CO2. The authors found that the progression of drought following rain events lead to increasing enrichment of the d18O signal of ecosystem respiration, and they relate this to an increasing importance of leaf respiration relative to soil respiration as the upper soil layers dry down. The pattern makes sense, and the observations are novel and informative. I have a few minor recommendations for improving the manuscript.

page 2, line 6: The abbreviation ET with T in subscript looks very similar to the abbreviation often used for evapotranspiration, ET with the T not in subscript. I wonder

if there would be a more distinguishing abbreviation that could be used to make clear when transpiration is being referred to rather than evapotranspiration.

page 3, line 25: Not clear what the phrase "even more" is referring to here? I think it means that at night leaf water enrichment can be more than the craig-gordon enrichment due to the lag in relaxation of the daytime leaf water enrichment toward the night time value. Perhaps this could be clarified.

page 14, line 14: In the calculations of P-Ep, when is the calculation reset? Is this for each rain event?

page 18, line 6: Sentence does not make sense.

Fig 8b: Does this figure indicate that the size of the rain event influences the size of the maximum change in dr following the rain event? I have a difficult time to interpret what the x-axis means in this figure.

Fig A2: This is interesting in that it seems to indicate that the post-pulse increase in dr is more related to VPD change than to soil water content change. VPD could drive both leaf water enrichment and transpiration, but this changes my interpretation about what is controlling the dR signal. It makes it appear as though Et is related to dr enrichment more through covariation with VPD, rather than driving dR per se. I suppose this could be addressed in a more controlled experiment, with manipulations to decouple Et and VPD, although I can see this would not necessarily be easy.

Interactive comment on Biogeosciences Discuss., 10, 1, 2013.